PART I - ADMINISTRATIVE

Section 1. General administrative information

Title of project

Improve Yakima River Water Quality By Incorporating Buffer Strips

BPA project number: 20152
Contract renewal date (mm/yyyy): ☐ **Multiple actions?**

Business name of agency, institution or organization requesting funding
Roza-Sunnyside Board of Joint Control

Business acronym (if appropriate) RSBOJC

Proposal contact person or principal investigator:

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NPPC Program Measure Number(s) which this project addresses
7.6B

FWS/NMFS Biological Opinion Number(s) which this project addresses

Other planning document references

Short description
Improve the water quality discharging to the lower Yakima River from the RSBOJC service area. This will enhance the quality of the existing wetlands and wildlife habitat areas that have developed in the lower Yakima River Basin.

Target species
Chinook, Coho, Sockeye, Steelhead, Bull Trout, Cutthroat, Brown Trout, Brook Trout

Section 2. Sorting and evaluation

Subbasin
Lower Yakima River

Evaluation Process Sort

CBFWA caucus	Special evaluation process	ISRP project type
Mark one or more	If your project fits either of these	Mark one or more categories

caucus	processes, mark one or both	
☒ Anadromous fish ☐ Resident fish ☐ Wildlife	☐ Multi-year (milestone-based evaluation) ☒ Watershed project evaluation	☐ Watershed councils/model watersheds ☐ Information dissemination ☐ Operation & maintenance ☐ New construction ☐ Research & monitoring ☒ Implementation & management ☐ Wildlife habitat acquisitions

Section 3. Relationships to other Bonneville projects

Umbrella / sub-proposal relationships. List umbrella project first.

Project #	Project title/description
20526	Multi-Year Plan Yakima Anadromous Fish Plan

Other dependent or critically-related projects

Project #	Project title/description	Nature of relationship
	Improve Water Quality Monitoring Program	This program will monitor the results of the buffer strip project.

Section 4. Objectives, tasks and schedules

Past accomplishments

Year	Accomplishment	Met biological objectives?

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
1	Inventory Project Waterways	a	Determine areas needing buffer strips
2	Define Buffer Sizes	a	Determine land acquisition requirements
3	Acquire Property	a	Survey & legal descriptions
		b	Negotiate with property owners
		c	Transfer title of property
4	Protect and Restore Buffer Strips	a	Determine fencing requirements

Objective schedules and costs

Obj #	Start date mm/yyyy	End date mm/yyyy	Measureable biological objective(s)	Milestone	FY2000 Cost %
1	04/1999	07/1999			5.00%
2	07/1999	08/1999			3.00%
3	8/1999	9/1999			28.00%
4	9/1999	11/1999			64.00%
				Total	100.00%

Schedule constraints
Negotiation with landowners for acquisition of property

Completion date
2004

Section 5. Budget

FY99 project budget (BPA obligated):

FY2000 budget by line item

Item	Note	% of total	FY2000
Personnel	RSBOJC Staff	%37	60,000
Fringe benefits		%19	30,000
Supplies, materials, non-expendable property	Fencing materials	%17	27,500
Operations & maintenance	None the first year	%0	
Capital acquisitions or improvements (e.g. land, buildings, major equip.)	Land acquisition	%25	40,000
NEPA costs		%0	
Construction-related support		%0	
PIT tags	# of tags:	%0	
Travel	Vehicle mileage	%1	2,000
Indirect costs	Office overhead	%1	1,500
Subcontractor		%0	
Other		%0	
TOTAL BPA FY2000 BUDGET REQUEST			$161,000

Cost sharing

Organization	Item or service provided	% total project cost (incl. BPA)	Amount ($)
		%0	
		%0	
		%0	
		%0	
Total project cost (including BPA portion)			$161,000

Outyear costs

	FY2001	FY02	FY03	FY04
Total budget	$100,000	$100,000	$100,000	$100,000

Section 6. References

Watershed?	Reference
☒	CH2M HILL, 1975. Agricultural Return Flow Management in the State of Washington. Prepared for Washington State Department of Ecology.
☒	Department of Ecology, 1990. Statewide Water Quality Assessment 350 (B) Report, State of Washington.
☒	USGS, 1976. Sediment Transport by Irrigation Return Flows in the Lower Yakima River Basin, WAshington. Open File Report 78-946.
☒	Joy, J. and Patterson, B. 1997 A suspended sediment and DDT total maximum daily load evaluation reprot for the Yakima River: Washington State Department of Ecology, Environmental Investigatons and Laboratory Services Program, Watershed Assessment Section,
☒	Rinella, J.F., McKenzie, S.W., Fuhrer, G.J., 1992, Surface-water-quality assessment of the Yakima River Basin, Washington, analysis of available water-quality data through 1985 water year: Geological Survey, Open-File Report 91-453, 244p.
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PART II - NARRATIVE

Section 7. Abstract

The Roza-Sunnyside Board of Joint Control is developing a long-range plan to increase salmon , steelhead and Chinook populations by improving water-quality by reducing sedimentation and temperature of the return flow water. Water-quality improvements will be accomplished by the incorporation of buffer strips along the drainage waterways that will restore, enhance, and protect the drains under the jurisdiction of the RSBOJC. The improvements will decrease sedimentation due to fewer disturbances in the drain by cattle and farming practices, thus enhancing fish and wildlife habitat. The RSBOJC will be responsible for monitoring and evaluating the project.

Section 8. Project description

a. Technical and/or scientific background

The lower Yakima River basin has been identified as one of the most intensively irrigated and agriculturally diverse regions in the United States. More than 325,000 acres of cropland is being irrigated in the Yakima Valley and a vast network of drains exist to convey excess water, in the form of irrigation- and agricultural-return flows, to the Yakima River. These return flows can account for as much as 80 percent of the lower Yakima River main-stem flow during the irrigation season. Return flows are seriously polluted and, as a result, the lower Yakima River exceeds permissible state standards for DDT, Ammoniea and other nutrients, temperature and turbidity. Because of these conditions, the Yakima River has been listed as impaired under the Federal Clean Water Act. Once abundant salmon and steelhead populations have dwindled to precariously low levels and other beneficial uses of the Yakima River water are in jeopardy. Consequently, the quality of the water in the lower Yakima River is highly dependent upon the quality of these agricultural-return flows(Joy and Patterson, 1997).

Wastes from some agricultural practices, irrigation-return drains, municipal and industrial treatment plant effluents, run-off from poorly managed forest and range practices, and urban runoff have been identified as pollutant sources, according to Ecology's Suspended Sediment and DDT Total Maximum Daily Load Evaluation Report for the Yakima River (Joy and Patterson, 1997). Intensive agriculture (return flows and grazing) has caused widespread habitat degradation. Resource problems include low flow at diversions, water quality degradation and pesticide. Low flows, high temperatures and sedimentation reduce fall Chinook spawning success.

The movement of suspended sediment in streams is an important factor in the transport and fate of chemicals in the environment. Many water-quality constituents including trace metals, organic compounds, indicator bacteria, and nutrients are associated with suspended sediment. Large suspended-sediment concentrations and associated contaminants can potentially affect water used for domestic-water supplies, aquatic-life propagation, and recreation (Rinella *et al.*, 1992). Sediment, predators and lack of side-channel refuges limit juvenile rearing and over-wintering survival. Sediment also limits egg-to- fry emergence survival for all species of salmonid in virtually all reaches of the Yakima Basin.

Water quality studies performed in the mid-1970's through the mid-1990's by Ecology, the U.S. Geological Survey, Washington State University, Conservation Districts, the United States Bureau of Reclamation (USBR), and others focused on irrigated agricultural areas in the lower Yakima River basin. Results from these studies indicated that suspended-sediment concentrations and turbidity in agricultural-return drains, and in the lower Yakima River, were directly affected by irrigation practices (Joy and Patterson, 1997). In fact, irrigation return flow has been identified as the single most significant source of pollutants to the lower Yakima River (Ecology, 1986).

The RSBOJC proposes that buffer strips in certain portions of the drainage system be developed and protected to maximize the water quality while maintaining the irrigation and drainage function of the facilities. The locations of the most favorable sites need to be determined by making a field inventory of the drainage waterways. It is anticipated that limited amounts of land adjacent to the waterways will be necessary to accomplish the goals because a certain amount of easements and right-of-ways exist. After the buffer strips are identified and the necessary property is purchased, the areas will be protected by installation of suitable fences and barriers to prevent encroachment.

The effectiveness of the buffer strip program will be measured in conjunction with the RSBOJC water quality-monitoring program. The concept of sediment removal by settling and filtration through natural vegetation is a well-proven technology and is currently working well in parts of the system. The presence of constituents such as turbidity, suspended solids, and fecal coliform in the water returning to the Yakima River are expected to diminish as the buffer strip program is implemented.

The RSBOJC service area contains over 1,000 miles of irrigation and drainage facilities. This project will focus on the Granger Drainage Basin where we maintain over 20 miles of joint drain. The RSBOJC's policy regarding buffer strips is to improve channel integrity, eliminating or vastly reducing erosion to the drainage channel banks and adjacent farm area.

This project will be broken into several phases. Phase 1 will concentrate on the survey of the drainage waterways in the Granger Drainage Basin which will identify problems that can be corrected by establishing or enhancing buffer strips. Once the areas have been ranked a pilot project consisting of one to miles of drain will be restored, fenced and the results monitored. The buffer strip program to enhance water quality could be implemented very quickly. With approval of funding, the first phase of the work could be completed within one year. As funding permits, additional buffer strips will be created in the other parts of the Granger Drainage Basin. At the funding rate requested, the Granger Drainage Basin program could be completed within approximately five years

b. Rationale and significance to Regional Programs

The concept of buffer strips fits into the goals and objectives of Section 7.6 of the Fish and Wildlife program.

This would be a positive action taken to rehabilitate the watershed in the interest of restoring salmon and steelhead stocks.

c. Relationships to other projects

The buffer strip project is related to efforts currently underway and proposed to improve the quality of water in the lower reaches of the Yakima River. This project specifically links to the RSBOJC water quality-monitoring program

On larger scale, the improvements made to the RSBOJC waterways will produce a significant increment of water quality improvement that is complementary to the programs done by others in the Yakima Basin.

d. Project history (for ongoing projects)

N/A

e. Proposal objectives

OBJECTIVE 1: Inventory Project Waterways
This survey will identify locations where problems exist that can be corrected by establishing or enhancing buffer strips. After the potential sites are identified, it will be necessary to evaluate the benefits and imparts associated with each one. Priority ranking for the sites can be developed to assure that the work is directed toward the one that would produce the best results at reasonable costs. The field review of sites will include details such as adjacent land use, utilities, typography, soil characteristics, land ownership, and access.

OBJECTIVE 2: Define Buffer Sizes
A determination would have to be made on what buffer sizes would best protect and restore the drainage areas. That determination will be based on details such as existing condition, adjacent land use, utilities, typography, soil characteristics, land ownership, and access.

OBJECTIVE 3: Acquire Property
The existing easements and right-of-ways have the potential to provide space for adequate buffers. In cases where additional land is needed to establish adequate buffers, it will be necessary to eliminate encroachments or acquire more land. Negotiations with the adjacent landowners will be needed in either case. Land transfers will require that existing and revised property lines be established and described by licensed surveyors.

OBJECTIVE 4: Protect and Restore Buffer Strips
Determine what the fencing requirements will be. Select a high-ranking project off the priority list described in objective 1. Protect the drain by restricting access with fences. The construction activities that will be required are expected to be quite simple. To establish the buffer strips it will only be necessary to install fences and barriers to define the areas. Roads will be constructed where the farming practice has caused soil erosion and the farms have encroached into the drains. The vegetation that is needed to control erosion and filter sediment from surface flows of water will establish itself naturally in most cases. There may be some locations that some regrading and seeding will be needed to restore heavy damage such as loss of topsoil or severe eroded gullies.

f. Methods

Implementation of the buffer strip project to improve the quality of water returning to the Yakima River will consist of several sequential steps. It will be necessary to survey the RSBOJC waterways, which consist of more than 1,000 miles of irrigation and drainage facilities. This survey will identify locations

where problems exist that can be corrected by establishing or enhancing buffer strip. After the potential sites are identified, it will be necessary to evaluate the benefits and impacts associated with each one. A priority ranking for the sites can be developed to assure that the work is directed toward the ones that will produce the best results at reasonable costs.

There will be a need for continuing inspection and maintenance of the buffer strips. RSBOJC has staff and is prepared integrate this on going activity into the channel maintenance program.

The rational behind the concept of buffer strips along the existing waterways is very basic. In most cases, the existing easements and rights-of-way have the potential to provide space for adequate buffers. Adjacent land uses such as cattle grazing and tillage have encroached into the areas adjacent to the waterways. The resulting removal of the natural vegetation and activity by cattle has resulted in channel bank damage, erosion, and higher levels of turbidity. Installation of fences to identify and protect the buffer strips will facilitate continued operation and maintenance of the irrigation and drainage facilities and improvements in water quality will result.

Expanding the agency's water quality program can monitor the success of the buffer strip project. Much background data has already been collected and will serve as a benchmark to measure the improvements.

g. Facilities and equipment

The work needed to complete the buffer strip project is similar to the type of work regularly performed by the RSBOJC staff. It is not anticipated that it will be necessary to acquire any additional specialized equipment or facilities. It may involve hiring temporary employees.

h. Budget

The budget was divided into five parts. The cost of RSBOJC staff included fringe benefits is $90,000. Fencing materials will cost $27,500. If land needs to be purchased, it is estimated at $40,000, which includes land surveying for legal description and utility relocation. Vehicle mileage will cost $2,000 and office overhead will total $1,500. The total cost will be $161,000.

Section 9. Key personnel

The work will be accomplished with RSBOJC staff, if needed limited amount of staff or contractor could be hired locally. The engineering staff includes three Degreed Civil Engineers and one Degreed Agricultural Engineer. One Civil Engineer is a registered professional engineer. Their combined experience in computer-aided drafting, computer software and equipment, surveying, design, hydrography, construction supervision, quality assurance inspections, and administrative responsibilities total over 50 years.

The construction phase will involve equipment operators, labors, and equipment owned by the Joint Board. The construction crews perform about $one million worth of construction annually.

The Board is prepared to integrate the need for inspection and maintenance of the buffer strips into it's on-going channel maintenance program.

Section 10. Information/technology transfer

The project is expected to serve as a demonstration of the benefits that can be achieved by managing the quality of water that returns to irrigation and drainage waterways by using managed buffer strips. This concept could be applied to many other irrigation and drainage projects and become an agency standard.

Congratulations!